Benefits of TVA's Water Quality Monitoring Program

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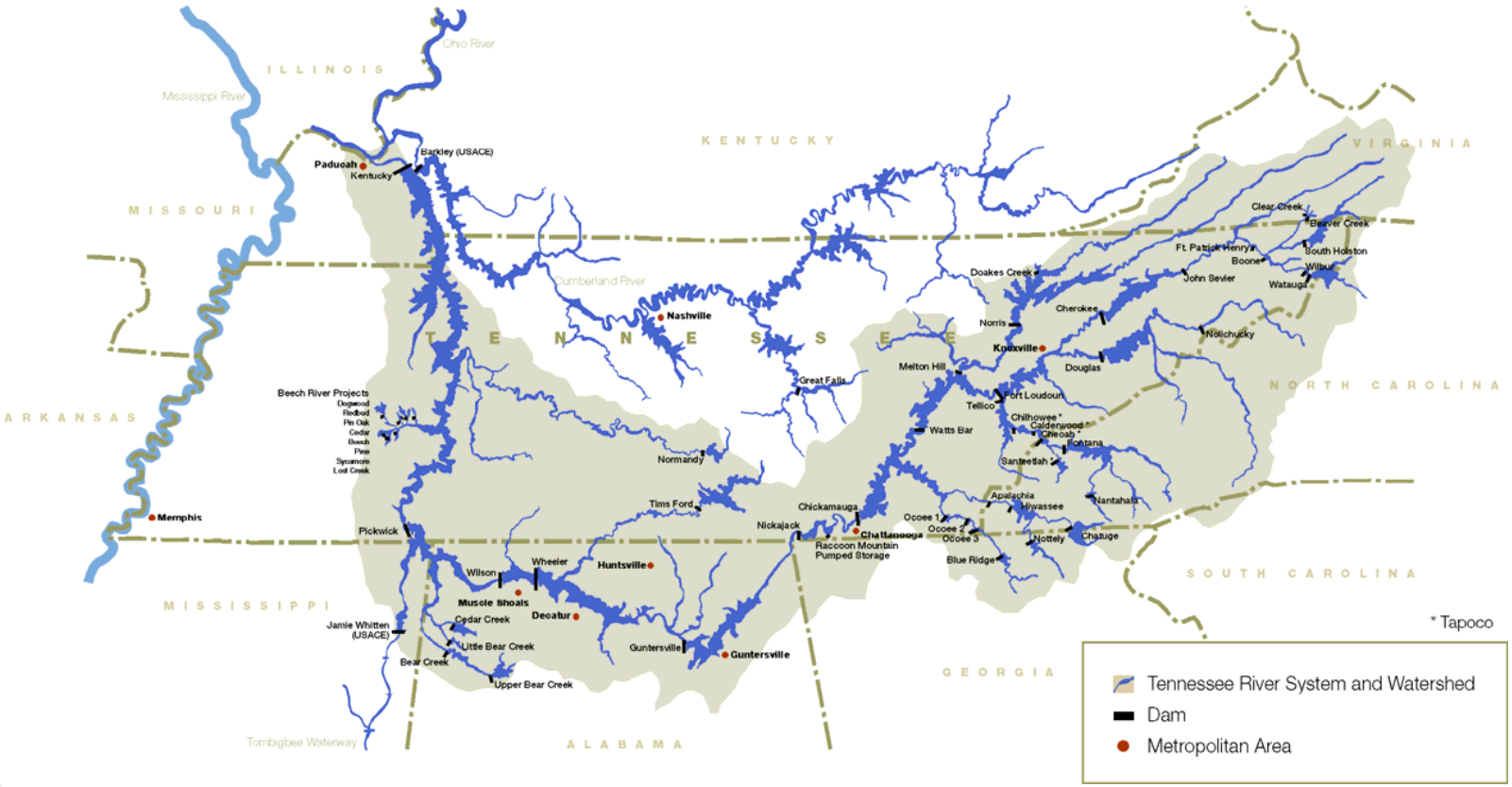
TVA Resource Stewardship

TVA Background

- Largest Public Power Producer & $7 Billion Federal Corporation
- Manages Nation's Fifth Largest River System
- Operates 49 Dams as an Integrated System
- 18.7 Million Acre-feet of Water Storage
- 11,000 Miles of Shoreline
- Receives no federal funding to provide these services

Tennessee River System

Tennessee River System



TVA's Mission

- Supplying Low-Cost, Reliable Power
- Supporting a Thriving River System
- Stimulating Economic Growth

TVA's Water Quality Monitoring Program Supports All Three Parts of TVA's Mission

Water Quality Monitoring Program

- TVA Maintains a Water Quality and Water Quantity Monitoring Network Throughout the Tennessee Valley to Provide Real-Time Data
  - Reservoir Release Improvements (RRI) Monitoring Program
  - Vital Signs Monitoring Program

Water Quality Monitoring Program

- RRI - Tailwaters Below Hydropower Dams Are Monitored for Dissolved Oxygen, Temperature, Total Dissolved Gases, and Associated Aquatic Life Changes

- Vital Signs – Physical, Chemical, and Biological Conditions in Rivers and Reservoirs; Fish Flesh Contamination; Bacteriological Monitoring at Recreation Areas

Low-Cost Reliable Power

- DO and Temperature Data for Hydro Operations
- Water Flow and Temperature to Support Thermal Plant Operation
- Tailwater Biota to Evaluate Reservoir Release Improvement Activities
- Monitor Zebra Mussel and Asiatic Clam Populations
- Monitoring Support for NPDES Permits
- Samples for Radiological Analysis

Thriving River System

<u>Ecological Condition</u>

- Reservoir Vital Signs
- Stream Health – Index of Biotic Integrity

<u>Human Uses</u>

- Bacteriological Monitoring at Recreation Areas
- Fish Tissue Studies for Fish Consumption
- Sport Fishing Information

Spring Sport Fish Survey

Spring Sport Fish Survey

Economic Growth

- Provide Data for Use in Siting and Design of Public and Industrial Water Supply
- Provide Data to Domestic Water Suppliers to Assist in Water Treatment Operations and Diagnosis of Abnormal Conditions
- Data Are Also Used to Provide Technical Assistance to Lift Barriers to Economic Growth

Uses of TVA Data

- Daily Reservoir Operations
- Shared With State and Federal Agencies
- Identifying Watershed Units Needing Focused Improvement Efforts
- Support Power Plant Permitting
- Providing Current, Reliable Data On Reservoir and Stream Water Quality To Stakeholders
- Analysis of Reservoir Operating Policy

Reservoir Operations Study

- Comprehensive Study of How TVA Operates its Integrated Reservoir System
- Objective: Determine Whether Changes in Operating Policy Could Produce Greater Overall Public Value
- Operating Policy affects:
  - Changes in Reservoir Levels
  - Amount and Timing of Water Flowing Through the System

Reservoir Operations Study

- ROS Included 35 Dams and Reservoirs Where TVA Schedules Water Releases and Reservoir Levels
- Public Involvement in Establishing ROS Scope and Objectives and Identifying Public Values With Respect to Those Objectives
- 12 Objectives Identified – 2 specifically address improving water quality and aquatic habitat

Water Quality Data in the ROS

- TVA Built a Computer Model (SysTempO) Linking Individual Water Quality Models for 29 Reservoirs and 11 Tailwater Streams
- Effects of Alternative Operating Policies on Water Quality Were Evaluated Using Modeled and Monitored Results
- Primary Water Quality Characteristics Examined Included:
  - Dissolved Oxygen Concentrations
  - Water Temperature
  - Chlorophyll Concentrations

Water Quality Data in the ROS

- TVA's Water Quality Monitoring Provided Data Critical to Meeting the Aggressive 2-Year Schedule
- New Modeling Capabilities Allowed Quick Analysis of Policy Alternatives
- Preferred Alternative Retains Benefits of Holding High Reservoir Levels Longer While Reducing Adverse Impacts to Water Quality, Aquatic Resources and Power Generation
- If Preferred Alternative Is Accepted, Water Quality Monitoring Will Be Critical To Determine Positive/Negative Impacts of New Operating Policy and To Guide Adaptive Management

Summary

- TVA Has an Extensive Water Quality and Water Quantity Monitoring Program
- Data is Used to Support Decision Making Related to All Three Parts of TVA's Mission
- Program Review Concluded Benefits of Monitoring is Critical to TVA's operations and the Valley